

# Illinois State Water Survey Division

GROUND-WATER SECTION  
AT THE  
UNIVERSITY OF ILLINOIS



SWS Contract Report 424A

## APPENDICES FOR:

### DEWATERING WELL ASSESSMENT FOR THE HIGHWAY DRAINAGE SYSTEM AT FOUR SITES IN THE EAST ST. LOUIS AREA, ILLINOIS (PHASE 2)

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Prepared for the  
Illinois Department of Transportation

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*Illinois Department of Energy and Natural Resources*

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Appendix A.  
Step Test Data

# DEWATERING WELL DATA

	Well No. <b>170 #1</b>	Piezometer No. <b>170 #1</b>
Date Drilled:		
Casing		
Top elevation:	409.7	
Diameter:	16-in. SS	2-in. PVC
Length:	45.0 ft	na
Screen		
Bottom elevation:	304.71	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	410.8	416.1
Nonpumping Water Level		
Depth below temp. MP:	36.30	---
Length of pipe extension:	9.13 ft	--
Depth below perm. MP:	27.17	32.53
Elevation:	383.63	383.57
Date of Step Test:	8/15/84	--
Water Sample		
Time:	--	--
Temperature:	61 ° F	-
Laboratory No.:	220249	--
Distance and Direction to Piez. from PW:		na
Time PW Off Before Step Test:		na

## WATER LEVEL MEASUREMENTS 170 No. 1

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
9:10 AM		36.32	32.52			
9:15		36.32	32.52			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 1

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
9:30		36.32				Started test, but it
9:34		36.30	32.53			became evident that the
9:36		36.30				pumping rate was very
10:24			32.53			low-open valve -330 gpm
10:25	1		34.56			Stopped test and had
	2		34.88			electrician come check
	3		34.90			system - OK
	4		34.98			
10:30	5	46.15	35.02			Abundance of iron deposits
10:32	7		35.06	.95	328	in discharge pipe in well pit. Possible suction problem?

SECOND START UP - WHEN ELECTRICIAN STARTED PUMP

11:25	0		32.53		-330	Pump On, Step 1
	12	46.02	35.16			
	14	46.07	35.18			
	16	46.08	35.22	-.95	328	Piez. tube level unstable
11:45	20	46.12	35.26	.95	328	
	25	46.16	35.29			
	29	46.17	35.31			
11:55	30	46.17	35.31			Decrease rate
11:56	1	45.74	35.22		-300	Step 2
	2	45.42	35.19	.78	296	
	3	45.38	35.14			
	4	45.38	35.10	.78	296	
12:00PM	5	45.38	35.10			
	6	45.39	35.10			
	8	45.39	35.10			
12:05	10	45.39	35.10	.78	296	
	12	45.38	35.11			
	14	45.40	35.11			
	16	45.39	35.11			
12:15	20	45.39	35.11			
	25	45.38	35.11			
	29	45.39	35.11			
12:25	30	45.39	35.11			Decrease rate
12:26	1	44.58	34.93	.63		Step 3
	2	44.56	34.93			
	3	44.54	34.92			
	4	44.53	34.90	.63	265	

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 1

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
12:30	5	44.53	34.90			
	6	44.53	34.90	.63	265	
	8	44.51	34.90			
12:35	10	44.51	34.90			
	12	44.50	34.90	.63	265	
	14	44.50	34.90			
	16	44.50	34.90			
12:45	20	44.50	34.90	.63	265	
	25	44.51	34.89			
	29	44.51	34.89			
12:55	30	44.51	34.89			Decrease rate
12:56	1	43.71	34.70			Step 4
	2	43.65	34.69			
	3	43.64	34.67			
	4	43.64	34.66			
1:00	5	43.64	34.66	.49	234	
	6	43.61	34.66			
	8	43.60	34.65			
1:05	10	43.59	34.64			
	12	43.59	34.64	.49	234	
	14	43.59	34.63			
	16	43.59	34.63			
1:15	20	43.58	34.62			
	25	43.57	34.62	.49	234	
	29	43.58	34.61			
1:25	30	43.58	34.62			Decrease rate
1:26	1	42.89	34.46	.39	-210	Step 5
	2	42.83	34.44			
	3	42.82	34.43			
	4	42.82	34.43			Sample collected, T = 61 °F
1:30	5	42.82	34.41			
	6	42.81	34.42			
	8	42.80	34.40	.39	210	
1:35	10	42.80	34.40	.39	210	
	12	42.79	34.39			
	14	42.79	34.39			
	16	42.79	34.38			
1:45	20	42.79	34.38	.39	210	
	25	42.79	34.38	.39	210	
	29	42.71	34.36			
1:55	30	42.71	34.36			End of test

# DEWATERING WELL DATA

	Well No. <b>I70 #4</b>	Piezometer No. <b>I70 #4</b>
Date Drilled:		
Casing		
Top elevation:	388.4	398.9
Diameter:	16-in. SS	2-in. PVC
Length:	25.3 ft	na
Screen		
Bottom elevation:	303.13	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Siot size:	0.80-in.	na
Measuring Point Elevation:	389.1	398.9
Nonpumping Water Level		
Depth below temp. MP:	18.00*	Plugged
Length of pipe extension:	8.35 ft	--
Depth below perm. MP:	9.65	--
Elevation:	379.45	--
Date of Step Test:	8/16/84	--
Water Sample		
Time:	4:40 p.m.	--
Temperature:	59° F	--
Laboratory No.:	220250	--
Distance and Direction to Piez. from PW:		
Time PW Off Before Step Test:		

\*Dropline measurement

WATER LEVEL MEASUREMENTS  
170 No. 4

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
12:40PM			17.99			
12:43		18.00				
12:50			17.99			MP = top of transducer block
12:55		18.00				
12:58		18.00				
12:59			18.00			
1 :00	0					Start pump
1:01	1	27.84	18.02			Step 1
	2	27.69	18.03	3.8		
	3	27.66	18.02			
	4	27.72		3.80	650	
1:05	5	27.73				
	6	27.80				
	8	27.83				
1:10	10	27.88				
	12	27.91				
	14	27.93				
	16	27.94	19.64	3.80		
	18		19.66			
1:20	20	27.96	19.67			
	25	28.03	19.69	3.80	650	
	29	28.04	19.72			
1:30	30	28.04	19.72			Decrease rate
1:31	1	27.28	19.77	3.19	600	Step 2
	2	27.24	19.71			
	3	27.22	19.71	3.17	600	
	4		19.71			
1:35	5					
	6	27.19	19.71			
	8	27.16	19.71			Piezometer plugged
1:40	10	27.13	19.71	3.07		Adjust rate
	12	27.12		3.22	600	
	14					
	17	27.38		3.24	600	
1:50	20	27.38				
	22	27.39		3.24	600	
	25	27.40				
	29	27.42				
2:00	30	27.43				Decrease rate
2:01	1	26.68		2.71	550	Step 3
	2	26.66				
	3	26.65		2.70	550	
	4	26.64				



WATER LEVEL MEASUREMENTS (Continued)  
170 No. 4

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
2:05	5	26.63				
	6	26.63				
	8	26.63				
2:10	10	26.64		2.70	550	
	12	26.64				
	14	26.64				
	16	26.66				
2:20	20	26.65				
	25	26.69				
	29	26.68		2.70	550	
2:30	30	26.68				Decrease rate
2:31	1	25.95		2.20		Step 4
	2	25.90				
	3	25.89				
	4	25.89				
2:35	5	25.90				
	6	25.89		2.22	500	
	8	25.88				
2:40	10	25.89				
	12	25.90				
	14	25.90				
	16	25.91				
2:50	20	25.90				
	25	25.93		2.22	500	
	29	25.93				
3:00	30	25.93		2.22	500	Decrease rate
3:01	1	25.22		1.81	450	Step 5
	2	25.21				
	3	25.21				
	4	25.19				
3:05	5	25.19				
	6	25.19		1.80	450	
	8	25.19				
3:10	10	25.18				
	12	25.18				
	14	25.18				
	16	25.18		1.80	450	
3:20	20	25.18				
	25	25.19				
	29	25.22		1.82	450	
3:30	30	25.21				Decrease rate

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 4

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
3:31	1	24.51		1.42	400	Step 6
	2	24.49				
	3	24.48				
	4	24.47				
3:35	5	24.45				
	6	24.45				
	8	24.46				
3:40	10	24.46				
	12	24.46				
	14	24.49				Bad reading
	16	24.45		1.42	400	
3:50	20	24.46				
	25	24.45				
	29	24.45				
4:00	30	24.45				Decrease rate
4:01	1	23.75		1.09	350	Step 7
	2					OOPS!
	3	23.72				
	4	23.73				
4:05	5	23.72		1.08	350	
	7	23.70				
	8	23.71				
4:10	10	23.71				
	12	23.70		1.09	350	
	14					Hung up
	16	23.70				
4:20	20	23.71				
	25	23.71				
	29	23.64				RCK reading
4:30	30	23.64				Decrease rate
4:31	1	22.92		0.79	300	Step 8
	2	22.91				
	3	22.91				
	4	22.91				
4:35	5	22.90				
	6	22.89				
	8	22.88				
4:40	10	22.88				Sample collected, T=59° F
	12	22.88				
	14	22.87		0.78	300	
	16	22.87				

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 4

<u>Hour</u>	<u>Time</u> <u>(min)</u>	<u>Adjusted</u> <u>depth to</u> <u>water</u> <u>in well</u> <u>(ft)</u>	<u>Adjusted</u> <u>depth to</u> <u>water in</u> <u>piezometer</u> <u>(ft)</u>	<u>Orifice</u> <u>tube</u> <u>piez.</u> <u>(ft)</u>	<u>Pumping</u> <u>rate</u> <u>(gpm)</u>	<u>Remarks</u>
4:50	20	22.87				
	25	22.87		0.78	300	
	29	22.87				
5:00	30	22.87		0.78	300	End of test

# DEWATERING WELL DATA

	Well No. <b>I70 #5</b>	Piezometer No. <b>I70 #5</b>
Date Drilled:		
Casing		
Top elevation:	385.3	391.1
Diameter:	16-in. SS	2-in. PVC
Length:	21.4 ft	na
Screen		
Bottom elevation:	303.91	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	385.9	391.1
Nonpumping Water Level		
Depth below temp. MP:	10.97	--
Length of pipe extension:	7.61	
Depth below perm. MP:	3.36	9.74
Elevation:	382.5	381.4
Date of Step Test:	7/10/84	--
Water Sample		
Time:	4:25 p.m.	--
Temperature:	58.7° F	--
Laboratory No.:	220112	--
Distance and Direction to Piez. from PW:		
Time PW Off Before Step Test:		>24 hrs

## WATER LEVEL MEASUREMENTS

170 No. 5

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:37AM	0	11.68	10.74			PW: Dropline 6908 -
11:46		10.97	9.74			P: #6909 Steel tape

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 5

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:55		3.36				from MP (permanent) - steel tape
12:02PM		11.68	10.74			Dropline
12:05	0					Pump on
12:06	1	15.17	11.18			Step 1
	2		11.27			
	3	14.46				
	4	14.76	11.36			
12:10	5	14.66	11.45			
	6	14.67	11.53	0.80	300	
	8	14.69	11.70			
12:15	10	14.70	11.84			
	12	14.72	11.93			
	14	14.73	12.01	0.80	300	
	16	14.75	12.08			
12:25	20	14.75	12.19			
	25	14.76	12.33	0.80	300	
	29	14.78	12.49			
12:35	30	14.78	12.49			Increase rate
12:36	1	15.24		1.09	350	Step 2
	2	15.30	12.43			
	3	15.33	12.60			
	4	15.32	12.67			
12:40	5	15.31	12.29			
	6	15.31	12.40			
	8	15.33	12.31			
12:45	10	15.33	12.19			P: Dropline 6909
	12	15.33	12.14			
	14	15.33	12.17	1.09	350	
	16	15.34	12.17			
	18		12.18			
12:55	20	15.34	12.18			
	25	15.34	12.18	1.09	350	
	29	15.37	12.19			
1:05	30	15.38	12.19			Increase rate
1:06	1	15.88	12.33	1.43	400	Step 3
	2	15.91	12.35			
	3	15.91	12.41	1.43	400	
	4	15.92	12.41			
	5	15.92	12.46			
	6	15.92	12.47			
	8	15.94	12.48			
1:15	10	15.95	12.51			
	12	15.95	12.54			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 5

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	14	15.97	12.57	1.43	400	
1:25	16	15.97	12.57			
	20	15.97	12.62	1.43	400	
	25	15.98	12.68			
	29	15.98	12.68			
1:35	30	15.99	12.68			Increase rate
1:36	1	16.49	12.73	1.81	450	Step 4
	2	16.50	12.73			
	3	16.52	12.77	1.81	450	
	4	16.51	12.74			
	5	16.53	12.77			
	6	16.52	12.79			
	8	16.55	12.80			
1:45	10	16.55	12.85	1.81	450	
	12	16.56	12.89			
	14	16.56	12.91			
	16	16.57	12.97			
1:55	20	16.56	13.00	1.81	450	
	26	16.58	13.00			
	29	16.57	13.00	1.81		
2:05	30	16.58				Increase rate
2:06	1	17.04				Step 5
	2	17.07	13.11	2.22	500	
	3	17.09	13.27			P: Dropline erratic
	4	17.07				
	5	17.10	13.23			
	6	17.10				
	7.5		13.34			
	8	17.10	13.20	2.22	500	P: Dropline okay
2:15	10	17.11	13.20			
	12	17.18	13.20			
	14	17.19	13.28			
	16	17.22	13.29	2.22	500	
2:25	20	17.15	13.29	2.22	500	
	25	17.15	13.31			
	29	17.15	13.38			
2:35	30	17.16	13.39			Increase rate
2:36	1	17.69	13.38			Step 6
	2	17.70	13.41	2.71	550	
	3	17.70	13.42			
	4	17.71	13.45	2.71	550	
	6	17.73	13.47			
	8	17.73	13.50			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 5

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
2:45	10	17.71	13.45			
	12	17.73	13.57			
	14	17.74	13.58			
	16	17.76	13.59			
2:55	20	17.78	13.62	2.71	550	
	25	17.79	13.66			
	29	17.81	13.67			
3:05	30		13.67			Increase rate
3:06	1	18.30	13.74	3.20	600	Step 7
	2	18.30	13.75			
	3	18.31	13.85	3.21	600	
	4	18.30	13.81			
	5	18.32	13.80			
	6	18.32	13.85			
	8	18.32	13.86	3.21	600	
3:15	10	18.33	13.88			
	12	18.32	13.87			
	14	18.30	13.95			
	16	18.34	13.95	3.22	600	
3:25	20	18.36	13.99			
	25	18.37	14.04	3.22	600	
	29	18.35	14.12			
3:35	30	18.35	14.12			Increase rate
3:36	1	18.90	14.08			Step 8
	2	18.89		3.80	650	
	3	18.90	14.11			
	4	18.92	14.15	3.80	650	
	5	18.92	14.17			
	6	18.92	14.19			
	8	18.93	14.22			
3:45	10	18.93	14.22			
	12	18.90	14.25			
	14	18.91	14.25			
	16	18.92	14.28	3.80	650	
3:55	20	18.94	14.33			
	25	18.93	14.37	3.80	650	
	29	18.96	14.37			
4:05	30	18.96	14.38			Increase rate
4:06	1	19.28	14.42	4.20	700	Step 9
	2	19.28	14.42			
	3	19.31	14.43	4.20	700	
	4	19.31	14.43			
	5	19.31	14.46			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 5

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	6	19.33	14.47			
	8	19.32	14.47	4.20	700	
4:15	10	19.31	14.52			
	12	19.31	14.56			
	14	19.33	14.56			
	16	19.36	14.58			Sample collected,
4:25	20	19.34	14.58	4.20	700	Temp. = 58.7° F
	25	19.35	14.61			
	29	19.36	14.65			
4:35	30	19.36	14.65			
	19.83			4.83	740	Max. rate



# DEWATERING WELL DATA

	Well No. <b>170 #8</b>	Piezometer No. <b>170 #8</b>
Date Drilled:		
Casing		
Top elevation:	381.1	387.5
Diameter:	16-in. SS	2-in. PVC
Length:	16.6 ft	na
Screen		
Bottom elevation:	304.76	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	382.3	387.5
Nonpumping Water Level		
Depth below temp. MP:	7.58	--
Length of pipe extension:	3.80	--
Depth below perm. MP:	3.78	8.85
Elevation:	378.52	378.65
Date of Step Test:	8/1/84	--
Water Sample		
Time:	1:35 p.m.	--
Temperature:	60.5° F	--
Laboratory No.:	220187	--
Distance and Direction to Piez. from PW:		9.9 ft SW
Time PW Off Before Step Test:		na

## WATER LEVEL MEASUREMENTS 170 No. 8

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
8:30AM			8.85			Steel tape
9:10		7.58				Steel tape
9:15		7.94				Electric dropline
9:21		7.914				

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 8

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
9:40		7 = 94	9.34			Electric dropline, piez. measurements to top of transducer block
10:00	0	7.94	9.21			New measurer - Start
10:01	1	14.61		.78	300	
	2	14.56	10.68			Piez. measured to top of casing
	3	14.70	10.70			
	4	14.29				
10:05	5	14.39				Took 5 min. for discharge to clear; very high iron
	6	14.38	10.75			
	8	14.31	10.79			Water level within a few ft of pavement; well within 75' of pavement centerline; heavy traffic
10:10	10	14.57	10.89			
	12	14.62	10.91			
	14	14.61	10.93	.76		Adjusted Q § 9 min.
	16	14.70	10.96	.78	300	Adjusted Q
10:20	20	14.72	11.00			Disc file lines are
	25	14.72	11.03	.80	300	49 sec. ahead
	29	14.73	11.03			
10:30	30	14.73	11.04			Increase rate
10:31	1	15.75	11.25	1.09	350	Step 2
	2	15.92	11.29			
	3	15.95	11.31			
	4	15.96	11.35			Collins reading
10:35	5	15.97	11.36			
	6	15.97	11.37			
	8	15.97	11.38	1.10	350	
10:40	10	15.98	11.38			
	12	15.98	11.31			RDO reading
	14	15.99	11.38			
	16	16.00	11.39	1.09	350	
10:50	20	16.00	11.39			
	25	16.02	11.40	1.10	350	
	29	16.04	11.42			
11:00	30	16.04	11.41			Increase rate
11:01	1	17.24	11.62	1.43	400	Step 3
	2	17.29	11.67			
	3	17.30	11.68			
	4	17.30	11.68			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 8

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
11:05	5	17.30	11.69			
	6	17.31	11.69			
	8	17.32	11.71	1.44	400	
11:10	10	17.32	11.71			
	12	17.32	11.72			
	14	17.33	11.72	1.44	400	
	16	17.33	11.74			
11:20	20	17.34	11.74	1.44	400	
	25	17.36	11.76			
	29	17.33	11.77			
11:30	30	17.36	11.76			New measurer on pumped well. Increase rate Step 4
11:31	1		11.99	1.81	450	
	2		12.02			
	3	18.60	12.04			
	4	18.61	12.03			
11:35	5	18.60	12.04			
	6	18.59	12.05	1.81	450	
	8	18.59	12.09			New measurer on piez. well
11:40	10	18.58	12.08			
	12	18.58	12.08			
	14	18.57	12.10	1.81	450	
	16	18.57	12.10			
11:50	20	18.57	12.11			
	25	18.59	12.12	1.85	450	
	29	18.60	12.13			
12:00PM	30	18.61	12.13			Increase rate
12:01	1	19.63	12.32	2.19	500	Step 5
	2	19.63	12.35			
	3	19.63	12.37			
	4	19.60	12.37			
12:05	5	19.60	12.37	2.19	500	
	6	19.60	12.37			
	8	19.59	12.38			
12:10	10	19.59	12.39			
	12	19.57	12.39			
	14	19.56	12.39			
	16	19.57	12.39	2.21	500	
12:20	20	19.57	12.41			
	25	19.58	12.42			
	29	19.58	12.46			P, new measurer, RCK
12:30	30	19.59	12.46			Increase rate

WATER LEVEL MEASUREMENTS (Continued)

170 No. 8

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
12:31	1	20.78	12.67	2.70	550	Step 6
	2	20.77	12.72			
	3	20.75	12.73			
	4	20.74	12.73			
12:35	5	20.73	12.73	2.70	550	
	6	20.72	12.74			
	8	20.74	12.76			P, 5 ft between 10 and 15 beads
12:40	10	20.65	12.75			Red sediment broke loose
	12	20.67	12.76	2.70	550	and came through on
	14	20.66	12.77			discharge
	16	20.66	12.77			
12:50	20	20.68	12.79	2.70	550	
	25	20.69	12.80	2.72	550	
	29	20.69	12.81			
1:00	30	20.69	12.81			Increase rate
1:01	1		13.02	3.19	600	Step 7
	2	21.78	13.06	3.21	600	
	3	21.75	13.06			
	4	21.73	13.06	3.20	600	
1:05	5	21.76	13.08			
	6	21.73	13.08			
	8	21.73	13.09			
1:10	10	21.73	13.09			
	12	21.73	13.11	3.23	600	
	14	21.73	13.12			
	16	21.73	13.13			
1:20	20	21.69	13.13	3.22	600	
	25	21.70	13.15			
	29	21.70	13.17	3.22	600	
1:30	30	21.69	13.16			Increase rate
1:31	1	22.36	13.27	3.52	625	Step 8
	2	22.37	13.29			Open all the way
	3	22.38	13.30	3.53	625	
	4	22.36	13.31			Sample collected, T = 60.5° F
1:35	5	22.35	13.31			
	6	22.36	13.31			

# DEWATERING WELL DATA

	Well No.	Piezometer No.
	170 #9	P-9
Date Drilled:		
Casing		
Top elevation:	399.7	404.62
Diameter:	16-in. SS	2-in. PVC
Length:		na
Screen		
Bottom elevation:		na
Diameter:	16-in. SS	2-in. PVC
Length:		3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	399.0	
Nonpumping Water Level		
Depth below temp. MP:	27.74	--
Length of pipe extension:	9.26 ft	--
Depth below perm. MP:	18.48	23.45
Elevation:	380.52	381.17
Date of Step Test:	6/28/84	--
Water Sample		
Time:	1:50 p.m.	--
Temperature:	60.5° F	--
Laboratory No.:	220091	--
Distance and Direction to Piez. from PW:		10.0 ft N
Time PW Off Before Step Test:		2 weeks approx.

## WATER LEVEL MEASUREMENTS 170 No. 9

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
10:05AM		28.83				
		27.74	23.45			Steel tape
			23.91			
10:17		23.96				

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 9

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
10:20		27.69	23.96			
10:22		27.89	23.94			
10:24		27.88	23.93			
10:27			23.93			
10:29			23.93			
10:30	0					Start
	1	32.39	25.92			
	2	32.36	25.66	0.80		
	3	32.39	25.66			
	4	32.41	25.68			
	5	32.42	25.69			
	6	32.44	25.71			
	8	32.46	25.72			
	10	32.49	25.76	0.80	300	
	12	32.51	25.79			
	14	32.52	25.78			
	16	32.55	25.81			
	20	32.57	25.84	0.81		
	25	32.60	25.87			
	29	32.63	25.88			
11:00	30	32.63	25.90			Increase rate
11:01	1		26.13			Step 2
	2	33.36	26.18	1.10	350	
	3	33.37	26.19			
	4	33.37	26.19			
	5	33.38	26.21			
	6	33.38	26.21			
	8	33.40	26.23			
	10	33.41	26.24	1.09	350	
	12	33.42	26.25			
	14	33.43	26.27			
	16	33.45	26.27			
	20	33.46	26.29	1.09	350	
	25	33.48	26.31			
	29	33.49	26.33			
11:30	30	33.49	26.34			Increase rate
11 :31	1	34.19	26.56			Step 3
	2	34.20	26.60	1.43	400	
	3	34.22	26.60			
	4	34.22	26.61			
	5	34.22	26.62			
	6	34.23	26.63			
	8	34.23	26.65			
	10	34.24	26.65			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 9

<u>Hour</u>	<u>time</u> <u>(min)</u>	<u>Adjusted</u> <u>depth to</u> <u>water</u> <u>in well</u> <u>(ft)</u>	<u>Adjusted</u> <u>depth to</u> <u>water in</u> <u>piezometer</u> <u>(ft)</u>	<u>Orifice</u> <u>tube</u> <u>piez.</u> <u>(ft)</u>	<u>Pumping</u> <u>rate</u> <u>(gpm)</u>	<u>Remarks</u>
	12	34.25	26.61			Changed reader, piez.
	14	34.26	26.62			
	16	34.26	26.62	1.41		Adjusted discharge
	20	34.26	26.65	1.43		
	25	34.34	26.66	1.43		
	29	34.34	26.67			
12:00PM	30	34.34	26.67			Increased rate
12:01	1	35.06	26.91	1.81	450	Step 4
	2	35.08	26.95			
	3	35.08	26.96			
	4	35.09	26.98			
	5	35.10	26.98			
	6	35.10	26.98	1.82	450	
	8	35.11	27.00			
	10	35.10	27.00			
	12	35.11	27.00			
	14	35.12	27.01			
	16	35.14	27.02	1.82		
	20	35.15	27.04	1.82		
	25	35.15	27.04			
	29	35.17	27.06			
12:30	30	35.17	27.06			Increased rate
12:31	1	35.86	27.28	2.22		Step 5
	2	35.87	27.32			
	3	35.86	27.33			
	4	35.87	27.34			
	5	35.87	27.35			
	6	35.87	27.35			
	8	35.88	27.35	2.22		
	10	35.90	27.36			
	12	35.90	27.37			
	14	35.92	27.39			
	16	35.92	27.38	2.22		
	20		27.44			APV; Piez.
	21.5	35.94				
	25	35.95	27.48	2.22	500	
	29	35.96	27.48			Increased rate
1:00	30	35.96	27.48			Step 6
1:01	1	36.64	27.70	2.71	550	
	2	36.66	27.75			
	3	36.66	27.78			
	4	36.69	27.77			
	5		27.78			

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 9

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	6	36.70	27.79	2.71	550	
	8	36.70	27.80			
	10	36.70	27.81			
	12	36.72	27.83			
	14	36.72	27.83			
	16	36.71	27.83	2.70	550	
	20	36.73	27.84			
	25	36.74	27.86			
	29	36.76	27.87			
1:30	30	36.76	27.87			Increase rate
1:31	1	37.57	28.09	3.20	600	Step 7
	2	37.47	28.14			
	3	37.48	28.15			
	4	37.47	28.16			
	5	37.47	28.16			
	6	37.48	28.16			
	8		28.17			Missed
	10		28.16			Missed
	11.5	37.47				
	12	37.50	28.18			
	14	37.58	28.18			
	16	37.57	28.20	3.20	600	
	20	37.60	28.20			T = 60.5° F
1 :54	24					Water samples collected
	25	37.61	28.23	3.19	600	
	29	37.62	28.21			
2:00	30	37.61	28.25			Increased rate
	1			3.53	630	Ended test



# DEWATERING WELL DATA

	Well No.	Piezometer No.
	170 #10	170 #10
Date Drilled:		
Casing		
Top elevation:	400.8	409.8
Diameter:	16-in. SS	2-in. PVC
Length:	37.4 ft	na
Screen		
Bottom elevation:	303.4	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	401.5	409.8
Nonpumping Water Level		
Depth below temp. MP:	32.53	--
Length of pipe extension:	9.0 ft	--
Depth below perm. MP:	23.53	Plugged
Elevation:	377.97	--
Date of Step Test:	7/31/84	--
Water Sample		
Time:	2:33 p.m.	--
Temperature:	61° F	--
Laboratory No.:	220186	--
Distance and Direction to Piez. from PW:		5.8 ft SE
Time PW Off Before Step Test:		na

## WATER LEVEL MEASUREMENTS

170 No. 10

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:25AM		32.53				Steel tape
11:30		32.48				Electric tape
11:48		32.50				
11:50		32.50				

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 10

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
12:02PM		32.50				
12:10		32.50				
12:25		32.50				
12:30		32.50				Pump on
12:31	1	43.07				Step 1
	2	40.00				
	3	39.35		.78	300	Adjusting rate
	4	39.34				
	5	39.33	28.56	.78	300	
	6	39.34	28.54			
	8	39.33	28.54			Piez. meas. to top of
12:40	10	39.34	28.53			transducer block
	12	39.43	28.53	.79	300	
	14	39.42	28.52			
	16	39.43	28.53			
12:50	20	39.44	28.53			
	25	39.48	28.52			
	29	39.49	28.52			
1:00	30	39.49	28.53			Increase rate
1:01	1	40.86	28.53			Step 2
	2	40.87	28.53	1.07	350	
	3	40.88	28.57			New measurer on piez.
	4	40.88	28.58			
	5	40.88	28.57			
	6	40.91	28.57	1.00	350	
	8	40.96	28.58	1.08	350	Adjusted rate
1:10	10	40.97	28.57	1.08	350	
	12	40.97	28.57			
	14	40.97	28.58			
	16	40.98	28.58	1.08	350	
1:20	20	40.99	28.58			
	25	41.00	28.57			
	29	41.01	28.57			
1:30	30	41.01	28.57			Increase rate
1:31	1	42.49	28.57			Step 3
	2	42.58	28.58			
	3	42.68	28.58	1.42	400	
	4	42.62	28.58			
	5	52.62	28.58			Piezometer plugged
	6	42.62				
	8	42.63				
1 :40	10	42.63				
	12	42.62				

WATER LEVEL MEASUREMENTS (Continued)  
170 No. 10

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	14	42.62				
	16	42.62		1.42	400	
1 :50	20	42.64				
	25	42.65				
	29	42.64				
2:00	30	42.64				Increase rate
2:01	1	44.64		1.90		Step 4
	2	44.58				Adjusting
	3	44.26		1.81	450	
	4	44.24				
	5	44.24				
	6	44.24				
	8	44.22				
2:10	10	44.23				
	12	44.21				
	14	44.24				
	16	44.25		1.82	450	
2:20	20	44.25				
	25	44.24		1.82	450	
	29					Missed readings
2:30	30	44.25				Increase rate
2:31	1	45.09		2.02	-480	Step 5. Valve wide open
	2	45.04				Water sample, T = 61° F
	3	45.04				Kit A
	4	45.04				
	5	45.04				
	6	45.04				
	8	45.03		2.02	480	
2:40	10	45.04				
	12					
	14	45.04				
	16					
2:50	20	45.05				
	25					End of test

# DEWATERING WELL DATA

	Well No.	Piezometer No.
	170 #11	170 #11
Date Drilled:		
Casing		
Top elevation:	396.1	403.2
Diameter:	16-in. SS	2-in. PVC
Length:	32.C ft	na
Screen		
Bottom elevation:	304.1	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	396.9	403.2
Nonpumping Water Level		
Depth below temp. MP:	24.12	--
Length of pipe extension:	5.65	--
Depth below perm. MP:	18.47	24.67
Elevation:	378.43	378.53
Date of Step Test:	8/2/84	--
Water Sample		
Time:	1 :00 p.m.	--
Temperature:	60.5° F	--
Laboratory No.:	220188	--
Distance and Direction to Piez. from PW:		5.2 ft W
Time PW Off Before Step Test:		na

## WATER LEVEL MEASUREMENTS 170 No. 11

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
9:15AM		24.12	28.67			Steel tape
9:20		24.52	25.29			Electric dropline
9:30		24.51	24.93			

WATER LEVEL MEASUREMENTS (Continued)  
170 No.11

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
10:05	0	24.52	24.94			
	1	32.14	24.97	.81	300	Pump on Step 1
	2	31.90	24.98			
	3	31.95	25.00			
	4	31.96	25.00			
10:10	5	31.98	25.01			
	6	31.99	25.01			
	8	32.00	25.04			
10:15	10	32.01	25.05			
	12	32.04	25.06			
	14	32.05	25.09			
	16	32.07	25.11			
10:25	20	32.09	25.14	.84	300	
	25	32.10	25.19			
	29	32.10				
10:35	30	32.11	25.21			Increase rate
10:36	1	33.16	25.21	1.08	350	Step 2
	2	33.18	25.23			
	3	33.19	25.24			
	4	33.19	25.25			
10:40	5	33.19	25.26			
	6	33.19	25.26			
	8	33.18	25.29	1.08	350	
10:45	10	33.19	25.30			
	12	33.20	25.32			
	14	33.23	25.34	1.08	350	
	16	33.26	25.36			
10:55	20	33.26	25.40			
	25	33.25	25.44	1.08	350	
	29					Missed readings
11:05	30	33.25	25.50			Increase rate
11:06	1	34.53	25.51	1.43	400	Step 3
	2	34.54	25.51			
	3	34.54	25.53			
	4	34.53	25.54	1.41	400	
11 :10	5	34.54	25.54			
	6	34.55	25.55			
	8	34.55	25.57			
11:15	10	34.56	25.60			
	12	34.57	25.61			
	14	34.56	25.63			
	16	34.57	25.66			

WATER LEVEL MEASUREMENTS (Continued)  
170 No.11

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:25	20	34.57	25.68			
	25	34.58	25.73	1.42	400	
	29	34.58	25.77			
11:35	30	34.58	25.78			Increase rate
11:36	1	35.98	25.80	1.82	450	Step 4
	2	36.04	25.81			
	3	36.03	25.82			
	4	36.04	25.83			
11:40	5	36.04	25.85			
	6	36.04	25.85			
	8	36.04	25.89			
11:45	10	36.04	25.90			
	12	36.04	25.92			
	14	36.04	25.95			
	16	36.05	25.96			
11:55	20	36.05	26.02	1.82	450	
	25	36.05	26.08	1.80	450	
	29	36.05	26.13			
12:05PM	30	36.05	26.12			Increase rate
12:06	1	37.18	26.15			Step 5
	2	37.25	26.15	2.00	475	
	3	37.27	26.16			
	4	27.27	26.18			
12:10	5	37.27	26.19			
	6	37.28	26.20			
	8	37.28	26.23			
12:15	10	37.26	26.24	1.99	475	
	12	37.29	26.29			
	14	37.28	26.30			
	16	37.30	26.33	2.00	475	
12:25	20	37.29	26.39			
	25	37.30	26.45			
	29	37.30	26.50			
12:35	30	37.30	26.52			Increase rate
12:36	1	38.70	26.53	2.71	550	Step 6
	2	38.74	26.56			
	3	38.72	26.57			
	4	38.72	26.59			
12:40	5	38.70	26.60	2.69	550	
	6	38.71	26.62			35-40 mark = 5.00 ft
	8	38.73	26.65			
12:45	10	38.71	26.68	2.70	550	
	12	38.73	26.71			

WATER LEVEL MEASUREMENTS (Continued)  
170 No.11

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	14	38.71	26.74			
	16	38.71	26.76			
12:55	20	38.73	26.82	2.69	550	
	25	38.75	26.90			Sample taken, T = 60.5° F
	29	38.77	26.95			
1 :05	30	38.76	26.95			Increase rate
				2.76	555	Wide open
						End of test

# DEWATERING WELL DATA

	Well No.	Piezometer No.
	164 #3	164 #3
Date Drilled:	1975	1975
Casing		
Top elevation:	393.63	401.03
Diameter:	16-in. SS	2-in. PVC
Length:	28.97	na
Screen		
Bottom elevation:	304.24	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	396.4	401.03
Nonpumping Water Level		
Depth below temp. MP:	23.31 ft	--
Length of pipe extension:	unk	--
Depth below perm. MP:	unk	17.14
Elevation:	-	383.89
Date of Step Test:	6/26/84	--
Water Sample		
Time:	2:38 p.m.	--
Temperature:	60° F	--
Laboratory No.:	220089	--
Distance and Direction to Piez. from PW:		5.2 ft SW
Time PW Off Before Step Test:		Approx. 2 weeks

## WATER LEVEL MEASUREMENTS 164 No. 3

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:35AM		20.67				
11:46		20.67				
11:50		23.31	17.13			PW: Steel tape



WATER LEVEL MEASUREMENTS (Continued)  
164 No. 3

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:53		20.67	17.16			
11:57		20.67	17.14			
12:00PM	0	20.67	17.14			Start pump Step 1
	1	28.43	17.14			
	2	25.77	17.15	.78	300	
	3	25.64	17.16			
	4	25.66	17.17			
12:05	5	25.68	17.18			
	6	25.70	17.18	.79	300	
	8	25.74	17.19			
12:10	10	25.77	17.20	.78	300	
	12	25.81	17.21			
	14	25.83	17.22			
	16	25.85	17.23			
12:20	20	25.88	17.26			
	25	25.90	17.29			
	29	25.94	17.30	.78	300	
12:30	30	25.94	17.31			Increase rate Step 2
	1	26.81	17.33			
	2	26.87	17.34	1.09	350	
	3	26.89	17.35			
	4	26.89	17.35			
12:35	5	26.90	17.36			
	6	26.91	17.37			
	8	26.92	17.38			
12:40	10	26.93	17.39	1.09	350	
	12	26.95	17.41			
	14	26.95	17.42			
	16	26.95	17.44	1.09	350	
12:50	20	26.99	17.48			
	25	27.02	17.53			
	29	27.03	17.55			
1:00	30	27.03	17.56			Increase rate Step 3
	1	27.84	17.57	1.43	400	
	2	27.88	17.58			
	3	27.89	17.59			
	4	27.90	17.60	1.43	400	
1:05	5	27.90	17.61			
	6	27.90	17.62			
	8	27.90	17.63			
1:10	10	27.92	17.66	1.43	400	
	12	27.94	17.67			
	14	27.94	17.69			
	16	27.94	17.70	1.43	400	

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 3

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
1:20	20	28.00				
	21		17.75			
	25	27.98	17.78			
	29	28.01	17.82	1.43	400	
1:30	30	28.01	17.83			Increase rate
	1	28.71	17.84	1.81	450	Step 4
	2	28.84	17.85			
	3	28.81	17.86			
	4	28.84	17.87			
1:35	5	28.85	17.88	1.81	450	
	6	28.85	17.89			
	8		17.91			
1:40	10	28.87	17.93			
	12	28.89	17.95			
	14	28.89	17.97			
	16	28.90	17.99	1.80	450	
1:50	20	28.92	18.00			
	25	28.93	18.07			
	29	28.93	18.13			
2:00	30	28.93	18.14			Increase rate
	1	29.68	18.15	2.22	500	Step 5
	2	29.73				
	3	29.75	18.18			
	4	29.76	18.19			
2:05	5	29.77	18.19			
	6	29.78	18.20			
	8	29.78	18.22	2.22	500	
2:10	10	29.80	18.25			
	12	29.79	18.27			
	14	29.81	18.29			
	16	29.81	18.31			
2:20	20	29.82	18.35			
	25	29.83	18.41			
	29	29.85	18.45			
2:30	30	29.85	18.45			Increase rate
2:38				2.45	525	Wide open; samples collected, temp 60° F

# DEWATERING WELL DATA

	Well No. 161 #10	Piezometer No. 164 #10
Date Drilled:	1975	1975
Casing		
Top elevation:	394.50	404.60
Diameter:	16-in. SS	2-in. PVC
Length:	30.55	na
Screen		
Bottom elevation:	303.54	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	395.4	404.60
Nonpumping Water Level		
Depth below temp. MP:	15.16	--
Length of pipe extension:	9.48 ft	--
Depth below perm. MP:	5.68	15.07
Elevation:	389.72	389.53
Date of Step Test:	7/11/84	--
Water Sample		
Time:	2:35 p.m.	--
Temperature:	61° F	--
Laboratory No.:	220113	--
Distance and Direction to Piez. from PW:		5.0 ft N/ parallel to highway
Time PW Off Before Step Test:		>24 hrs

## WATER LEVEL MEASUREMENTS 164 No. 10

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
8:17AM	0	15.36				Steel tape, top of temp MP
8:18	0		15.53			Dropline
8:20	0	15.29				Steel tape, temp MP

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 10

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
8:21	0		15.52			Dropline
8:24	0	15.16				Steel tape
8:25	0	15.16				Steel tape
8:25	0		15.54			Dropline
8:27	0		15.07			Steel tape
8:28	0		15.07			Steel tape
8:28	0	16.05				Dropline
9:01	0	16.06	15.57			Dropline readings
9:08	0		15.56			
9:34	0		15.57			
10:55	0	16.06	15.57			
10:58						Pump on - not pumping full pressure
11 :04						Pump off
11 :05						Pump on
11:07						Pump off
11 :08						Pump on
11:10	0					Pump at full pressure. Step 1. Adjusting rate. Pump was running backwards.
	5	19.79	17.85	0.80	300	PW = EWS; P = MH
	6	19.79	17.81			
	7	19.78	17.83	0.81	300	
	8	19.78	17.85			
	9	19.80	17.90			
11:20	10	19.80	17.89	0.81	300	
	11	19.80	17.88			
11:22	12	19.82	17.86			
	14	18.82	17.92	0.82	300	
	16	19.83	17.89			
11:30	20	19.85	17.92	0.82	300	
	25	19.88	17.94			
	29	19.88	17.92	0.82	300	
11:40	30	19.89	17.92			Increase rate
	1	20.40	18.22	1.10	350	Step 2
	2	20.42	18.27			
	3	20.44	18.29			
	4	20.45	18.30			
	5	20.45	18.31			
	6	20.47	18.34			
	8	20.48	18.33	1.10	350	

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 10

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
11:50	10	20.49	18.35			
	12	20.50	18.37			
	14	20.50	18.36			
	16	20.52	18.37	1.10	350	
12:00PM	20	20.53	18.37			
	25	20.53	18.36			
	29	20.54	18.39			
12:10	30	20.54	18.39			Increase rate
	1	21.04	18.65			Step 3
	2	21.08	18.69	1.43	400	
	3	21.09		1.44	400	P: DC
	4	21.11	18.77			
	5	21.13				
	6	21.14	18.76			
	8	21.14	18.76			
12:20	10	21.15	18.80	1.44	400	
	12	21.15	18.81			
	14	21.16	18.78			
	17	21.17	18.70			
12:30	20	21.18	18.65	1.44	400	P: Cleaned probe wire end
	25	21.18	18.67			
	29	21.19	18.66			
12:40	30	21.19	18.66			Increase rate
	1	21.66	18.92	1.81	450	Step 4
	2	21.72	18.95			
	3	21.74	18.98			
	4	21.75	18.99			
	5	21.76	19.00	1.81	450	
	6	21.77	19.00			
	8	21.78	19.01	1.81	450	
12:50	10	21.79	19.02			
	12	21.80	19.03	1.81	450	
	14	21.81	19.04			
	16	21.80	19.05			
1:00	20	21.82	19.05	1.81	450	
	25	21.82	19.07			
	29	21.83	19.07	1.81	450	
1:10	30	21.83	19.07			Increase rate
	1	22.30	19.34	2.22	500	Step 5
	2	22.36	19.38			
	3	22.37	19.39			PW: MH measuring
	4	22.39	19.40	2.22	500	
	5	22.40	19.40			

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 10

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
	6	22.41	19.41			
	8	22.40	19.42			
1 :20	10	22.41	19.44			
	12	22.41	19.44			
	14	22.41	19.45			
	16	22.42	19.45			
1:30	20	22.42	19.46	2.22	500	
	25	22.42	19.45			
	29	22.44	19.46	2.22	500	
1:40	30	22.44	19.46			Increase rate
	1	22.98	19.76	2.71	550	Step 6
	2	23.01	19.76			
	3	23.03	19.82	2.70	550	
	4	23.04	19.83			
	5	23.06	19.84			
	6	23.06	19.85	2.70	550	
	8	23.06	19.86			
1:50	10	23.07	19.86			
	12	23.07	19.86			
	14	23.10	19.87	2.70	550	
	16	23.09	19.88			
2:00	20	23.10	19.89	2.70	550	
	25	23.11	19.90			
	29	23.11	19.91			
2:10	30	23.11	19.91			Increase rate
	1	23.60	20.15	3.20	600	Step 7
	2	23.62	20.19			
	3	23.65	20.21			
	4	23.66	20.23	3.20	600	
	5	23.67	20.23			
	6	23.67	20.22			
	8	23.69	20.24			
2:20	10	23.69	20.25			
	12	23.69	20.26			
	14	23.71	20.27	3.22	600	
	16	23.71	20.28			
2:30	20	23.72	20.29			
	25	23.72	20.29	3.22	600	Sample collected at
	29	23.72	20.30			Sample "B", temp = 61 ° F
2:40	30	23.72	20.31			

3.25 = Maximum pumping rate

# DEWATERING WELL DATA

	Well No. 164 #11	Piezometer No. 164 #11
Date Drilled:	1975	1975
Casing		
Top elevation:	396.02	--
Diameter:	16-in. SS	2-in. PVC
Length:	31.23 ft	na
Screen		
Bottom elevation:	304.52	na
Diameter:	16-in. SS	2-in. PVC
Length:	60.27	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	397.0	402.32
Nonpumping Water Level		
Depth below temp. MP:	24.69*	--
Length of pipe extension:	7.02	--
Depth below perm. MP:	17.67	23.33*
Elevation:	379.33	378.99
Date of Step Test:	8/14/84	--
Water Sample		
Time:	2:32 p.m.	--
Temperature:	61 ° F	--
Laboratory No.:	220248	--
Distance and Direction to Piez. from PW:		5.0 ft NE
Time PW Off Before Step Test:		Unk

\*Dropline measurements

WATER LEVEL MEASUREMENTS  
164 No. 11

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
11:00AM		24.70	23.26			
11:10		24.70	23.33			
11:25		24.70	23.33			
11:35		24.70	23.33			
11:51		24.69	23.38			
12:00PM	0					Pump on
	1	27.93	23.50			Step 1
	2	28.16	23.58	.80	300	
	3	28.19	23.64			
	4	28.21	23.68	.80	300	
12:05	5	28.23	23.72			
	6	28.23	23.78			
	8	28.25	23.87			
12:10	10	28.28	23.96			
	12	28.29	24.06	.80	300	
	14	28.30	24.13			
	16	28.30	24.21			
12:20	20	28.34	24.39			
	25	28.35	24.50			
	29	28.36	24.64			
12:30	30		24.66			Increase rate
12:31	1	28.93	24.69	1.10	350	Step 2
	2	28.95	24.74			
	3	28.97	24.77			
	4	28.97	24.80			
12:35	5	28.98	24.83	1.10	350	
	6	28.99	24.83			
	8	28.99	24.91			
12:40	10	29.00	24.99			
	12	29.01	25.03			
	14	29.02	25.08			
	16	29.02	25.11	1.10	350	
12:50	20	29.03	25.18			
	25	29.04	25.26	1.10	350	
	29	29.06	25.31			
1:00	30	29.06	25.34			Increase rate
1 :01	1	29.57	25.35			Step 3
	2	29.60	25.37			
	3	29.61	25.39			
	4	29.61	25.40	1.43	400	
1:05	5	29.62	25.43			
	6	29.63	25.45			
	8	29.63	25.45			



WATER LEVEL MEASUREMENTS (Continued)  
164 No. 11

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
1:10	10	29.63	25.52	1.43	400	
	12	29.63	25.59			
	14	29.64	25.59			
	16	29.65	25.60			
1:20	20	29.66	25.66			
	25	29.66	25.72			
	29	29.67	25.75	1.43	400	
1:30	30	29.67	25.76			Increase rate
1:31	1	30.20	25.78			Step 4
	2	30.22	25.79	1.81	450	
	3	30.23	25.81			
	4	30.25	25.83			
1:35	5	30.26	25.84	1.81	450	
	6	30.26	25.85			
	8	30.27	25.87			
1:40	10	30.27	25.90	1.81	450	
	12	30.28	25.93			
	14	30.28	25.96			
	16	30.29	25.99			
1:50	20	30.29	26.04			
	25	30.29	26.10			
	29	30.30	26.13			
2:00	30	30.30	26.14			Increase rate
2:01	1	30.81	26.16	2.20	500	Step 5
	2	30.84	26.17			
	3	30.85	26.19			
	4	30.85	26.20			
2:05	5	30.85	26.22			
	6	30.85	26.24			
	8	30.86	26.26	2.19	500	
2:10	10	30.86	26.29			
	12	30.87	26.32			
	14	30.87	26.34			
	16	30.87	26.36	2.19	500	
2:20	20	30.87	26.40			
	25	30.88	26.44			
	29	30.88	26.49			
2:30	30	30.89	26.49			Increase rate
2:3V	1	31.11	26.51	2.38		Step 6
	2	31.12	36.51			Sample collected, water
	3	31.12	36.53			temp 61 °
	4	31.12	36.54			

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 11

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
2:35	5	31.13	36.54			
	6	31.13	36.55			
	8	31.13	36.56			
2:40	10	31.13	36.57			End of test
						Max rate = 520 gpm

# DEWATERING WELL DATA

	Well No.	Piezometer No.
	164 #13	164 #13
Date Drilled:	1975	1975
Casing		
Top elevation:	393.33	399.13
Diameter:	16-in. SS	2-in. PVC
Length:	39.0 ft	na
Screen		
Bottom elevation:	304.19	na
Diameter:	16-in. SS	2-in. PVC
Length:	60.14 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	394.3	399.13
Nonpumping Water Level		
Depth below temp. MP:	17.63	--
Length of pipe extension:	7.02	--
Depth below perm. MP:	10.61	15.30
Elevation:	383.7	383.83
Date of Step Test:	7/12/84	--
Water Sample		
Time:	12:35 p.m.	--
Temperature:	60.7° F	--
Laboratory No.:	220114	--
Distance and Direction to Piez. from PW:		4.8 ft S
Time PW Off Before Step Test:		>48 hrs

## WATER LEVEL MEASUREMENTS 164 No. 13

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
8:38AM	0		15.30			Steel tape
8:39	0		15.30			Steel tape
8:42	0	17.63				Steel tape, top of temp MP
	0	17.62				Steel tape, top of temp MP

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 13

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
8:55	0		15.63			Dropline #6909
8:58	0	18.45				Dropline #6908
8:59	0		15.60			P: DC measure
9:00	0	18.45				PW: EWS measure
9:02	0	18.46				
9:03	0	18.45	15.60			
9:05	0					Start pump
	1	21.18	16.79			Step 1
9:07	2	21.14	16.88	0.80	300	
	3	21.17	16.90			
	4	21.20	16.93			
9:10	5	21.22	16.96	0.80	300	
	6	21.23	16.99			
	8	21.30	17.03			
9:15	10	21.29	17.05			
	12	21.30	17.06	0.80	300	
	14	21.33	17.08			
	16	21.35	17.10	0.81	300	
9:25	20	21.39	17.14			
	25	21.43	17.17			
	29.5	21.45	17.20	0.80	300	
9:35	30	21.45	17.21			Increase rate
9:36	1	21.89				Step 2
	2	21.88				
	3	21.88	17.44	1.09	350	
	4	21.90	17.44			
	5	21.92	17.46			
	6	21.91	17.46			
	8	21.93	17.47	1.10	350	
9:45	10	21.93	17.48	1.09		
	12	21.95	17.50			
	14	21.96	17.51			
	16	21.97	17.53	1.09	350	
9:55	20	21.99	17.54			
	25	22.00	17.56	1.09	350	
10:05	30	22.02	17.58			Increase rate
10:06	1	22.40	17.76			Step 3
	2	22.42	17.77			Ajusting rate
	3	22.41	17.76	1.43	400	
	4	22.33	17.74			
	5	22.34	17.74			
	6	22.34	17.75			
	8	22.33	17.76	1.43	400	

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 13

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
10:15	10	22.35	17.78			
	12	22.35	17.78			
	14	22.36	17.79	1.43	400	
	16	22.38	17.79			
10:25	20	22.38	17.79	1.42	400	
	25	22.40	17.81			
	29	22.40	17.83			
10:35	30	22.40	17.84			Increase rate
10:36	1	22.85	18.01			Step 4
	2	22.86	18.04	1.81	450	
	3	22.86	18.05			
	4	22.87	18.06			
	5	22.88	18.06			
	6	22.89	18.07	1.81	450	
	8	22.90	18.07	1.81	450	
10:45	10	22.92	18.08			
	12	22.91	18.09			
	14	22.92	18.10			
	16	22.92	18.11			
10:55	20	22.95	18.12			
	25	22.96	18.13			
	29	22.96	18.16	1.80	450	
11:05	30	22.97	18.17			Increase rate
11:06	1	23.35	18.33	2.22	500	Step 5
	2	23.35	18.33			
	3	23.35	18.34			
	4	23.35	18.34	2.22	500	
	5	23.36	18.35			
	6	23.39	18.36			
	8	23.38	18.37			
11:15	10	23.39	18.37			
	12	23.39	18.38	2.22	500	
	14	23.41	18.39			
	16	23.40	18.40			
11:25	20	23.42	18.41	2.22	500	
	25	23.48	18.46	2.27		Shifted hose
	27			2.22	500	Adjust rate
	29	23.42	18.43			
11:35	30	23.42	18.43			Increase rate
11:36	1	23.85	18.61			Step 6
	2	23.85	18.63	2.71	550	
	3	23.86	18.64			
	4	23.86	18.65	2.71	550	
	5	23.87	18.65			

WATER LEVEL MEASUREMENTS (Continued)  
164 No. 13

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	6	23.88	18.66			
	8	23.89	18.67			
11:45	10	23.89	18.68	2.72	550	
	12	23.90	18.68			
	14	23.91	18.69			
	16	23.90	18.70			
11:55	20	23.92	18.71	2.70	550	
	25	23.94	18.72	2.71	550	
	29	23.95	18.73			
12:05PM	30	23.95	18.73			Increase rate
12:06	1	24.21	18.87	3.07		Step 7
	2	24.29	18.90			
	3	24.30	18.91			
	4	24.31	18.91	3.11	600	
	5	24.31	18.92			
	6	24.31	18.92	3.11	600	T = 60 . 7 ° F
	8	24.32	18.93	3.11	600	
12:15	10	24.32	18.94			
	12	24.33	18.96	3.11	600	
	14	24.33	18.96			
	16	24.34	18.96	3.11	600	
12:25	20	24.35	18.97			
	25	24.37	18.99	3.11	600	
	29	24.37	19.00	3.11	600	
12:35	30	24.37	19.00			End of test

# DEWATERING WELL DATA

	Well No. 25th St. #6	Piezometer No. 25th St. #6
Date Drilled:	1975	1975
Casing		
Top elevation:	395.57	404.47
Diameter:	16-in. SS	2-in. PVC
Length:	34.17	na
Screen		
Bottom elevation:	301.40	na
Diameter:	16-in. SS	2-in. PVC
Length:	60 ft	3 ft
Slot size:	0.80-in.	na
Measuring Point Elevation:	395.57	404.47
Nonpumping Water Level		
Depth below temp., MP:	15.84	--
Length of pipe extension:	8.73 ft	--
Depth below perm. MP:	7.11	Plugged
Elevation:	388.46	--
Date of Step Test:	6/27/84	--
Water Sample		
Time:	2:14 p.m.	--
Temperature:	58.5° F	--
Laboratory No.:	220090	--
Distance and Direction to Piez. from PW:		4.85 ft NW
Time PW Off Before Step Test:		Approx. 2 weeks

## WATER LEVEL MEASUREMENTS 25th Street No. 6

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
8:53AM		16.18				
8:58		15.84	2.88			Steel tape
9:00		16.20				Piezometer plugged

WATER LEVEL MEASUREMENTS (Continued)  
25th Street No. 6

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
9:15	0		3.25			
	1	21.17	3.25	.8	300	Adrian reading well
	2	20.81	3.26			
	3	20.81	3.25			
	4	20.81	3.25			
	5	20.81	3.27	.8	300	
	6	20.82	3.26			
	8	20.82	3.26			
	10	20.84	3.26			
	12	20.85		.8	300	
	14	20.85				
	16	20.86				
	20	20.86				
	25	20.87		.8		
	29	20.87				
9:45	30	20.88				
	1	21.74		1.09	350	
	2	21.65				
	3	21.64		1.09	350	
	4	21.64				
	5	21.66				
	6	21.66				
	8	21.67		1.09	350	
	10	21.68				
	12	21.67				
	14	21.67				
	16	21.67				
	20	21.69		1.09	350	
	25	21.67				Bob K. reader
	30	21.67				
10:15	1	22.49		1.43	400	
	2	22.50				
	3	22.50		1.43	400	
	4	22.50				
	5	22.50				
	6	22.51				Choo-choo train
	8	22.51				
	10	22.51				
	12	22.52				
	14	22.52				
	16	22.52				
	20	22.52				
	25	22.52				
	29	22.53				



WATER LEVEL MEASUREMENTS (Continued)  
25th Street No. 6

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
10:45	30	22.53				
	1	23.31		1.81	450	
	2	23.32				
	3	23.32				
	4	23.33				
	5	23.34				
	6	23.34				
	8	23.34				
	10	23.35				
	12	23.34		1.81	450	
	14	23.34				
	16	23.34				
	20	23.34				
	25	23.35				Another train
	29	23.37				Adrian reading
11:15	30	23.36				
	1	24.10		2.22	500	
	2	24.13				
	3	24.13				
	4	24.14				
	5	24.14				
	6	24.16				
	8	24.16		2.22	500	
	10	24.15				
	12	24.14				
	14	24.15				
	16	24.15				
	20	24.15		2.22	500	
	25	24.17				
	29	24.17		2.22	500	
11:45	30	24.17				
	1	24.91		2.71	550	
	2	24.95				Probe seems to hang up
	3	24.96				around the 25 ft mark
	4	24.96				
	5	24.97				
	6	24.98				
	8	24.98				
	10	24.98		2.71	550	
	12	24.98				
	14	24.97				
	16	24.95		2.71	550	Bob K. reading

WATER LEVEL MEASUREMENTS (Continued)  
25th Street No. 6

<u>Hour</u>	<u>Time (min)</u>	<u>Adjusted depth to water in well (ft)</u>	<u>Adjusted depth to water in piezometer (ft)</u>	<u>Orifice tube piez. (ft)</u>	<u>Pumping rate (gpm)</u>	<u>Remarks</u>
	20	24.95				
	25	24.95				
	29	24.96				
12:15PM	30	24.96				
	1	252.68		3.20	600	
	2	25.70				
	3	25.70				
	4	25.70				
	5	25.70				
	6	25.70				
	8	25.70				
	10	25.70				
	13	25.71				
	14	25.71				
	16	25.71				
	20	25.71		3.20	600	
	25	25.72				
	29	25.72				
12:45	30	25.72				
	1	26.54		3.80	650	
	2	26.56				
	3	26.56				
	4	26.56				
	5	26.56				
	6	26.56				
	8	26.56				
	10	26.56		3.80	650	
	12	26.54				Changed readers
	14	26.54				
	16	26.54				
	20	26.54		3.79	650	
	25	26.55				
	29	26.55		3.80	650	
1:15	30	26.54				
	1	27.11		4.20	700	
	2	27.11				
	3	27.08				
	4	27.11				
	5	27.10				
	6	27.10				
	8	27.10				
	10	27.10				
	12	27.11				
	14	27.11				

WATER LEVEL MEASUREMENTS (Continued)  
25th Street No. 6

Hour	Time (min)	Adjusted depth to water in well (ft)	Adjusted depth to water in piezometer (ft)	Orifice tube piez. (ft)	Pumping rate (gpm)	Remarks
	16	27.10		4.20	700	
	20	27.10				
	25	27.10				
	29	27.08				
1:45	30	27.11				
	1	28.11				
	2	28.14		5.00	750	
	3	28.12				
	4	28.11				
	5	28.11				
	6	28.11				
	8	28.11				
	10	28.11				
	12	28.10		4.98	750	
	14	28.10				
	16	28.10				Adjusted rate up
	20	28.11		5.00	750	
	25	28.10				
2:14	29	28.11				T = 58.5° F sample
2:15	30	28.15				Increased rate
				5.43	775	Wide open
						End of test

Appendix B.

Chemical Analyses,  
Dewatering Wells

Appendix B. Chemical Quality of Groundwater at IDOT Dewatering Sites at I-70

Site	I-70	I-70	I-70	I-70
Well No.	1	4	5	8
Section Location T.2N., R.9W., St. Clair Co.	7.8b	7.7b	7.7b	7.7b
Date Collected	8/15/84	8/17/84	7/10/84	8/1/84
Laboratory No.	220249	220250	220112	220187
Iron (Fe),mg/l	10.2	9.2	11.6	13.5
Calcium (Ca),mg/l	201.	197.	148.	210.
Magnesium (Mg),mg/l	45.0	46.2	37.2	44.5
Sodium (Na),mg/l	124.	62.8	29.3	69.6
Strontium (Sr),mg/l	-	-	0.7	-
Silica(SiO <sub>2</sub> ), mg/l	29.8	29.7	32.0	30.4
Nitrate (NO <sub>3</sub> ),mg/l	3.7	0.7	<0.3	<0.3
Chloride(Cl),mg/l	136.	125.	84.	89.
Sulfate (SO <sub>4</sub> ),mg/l	320.	247.	169.	332.
Alkalinity (as CaCO <sub>3</sub> ), mg/l	480.	408.	336.	438.
Hardness (as CaCO <sub>3</sub> ), mg/l	687.	632.	524.	707.
Total dissolved minerals,mg/l	1203.	982.	775.	1076.
Turbidity (lab)	67	62	90	85
Color	<1	<1	<1	<1
Odor	None	None	None	None
pH (in lab)	7.0	7.0	7.2	7.0
Temperature, °F	61.	59.	58.7	60.5

Appendix B. Chemical Quality of Groundwater at IDOT Dewatering Sites at I-70

Site	I-70	I-70	I-70
Well No.	9	10	11
Section Location T.2N., R.9W., St. Clair Co.	7.7b	7.6b	7.6b
Date Collected	6/28/84	7/31/84	8/2/84
Laboratory No.	220091	220186	220188
Iron (Fe),mg/l	12.2	13.1	13.1
Calcium (Ca),mg/l	178.	202.	169.
Magnesium (Mg),mg/l	43.4	51.2	43.0
Sodium (Na),mg/l	81.5	47.9	47.5
Strontium (Sr),mg/l	-	-	-
Silica(SiO <sub>2</sub> ), mg/l	32.2	33.3	31.8
Nitrate (NO <sub>3</sub> ),mg/l	0.4	<0.3	<0.3
Chloride(Cl),mg/l	108.	67.	72.
Sulfate(SO <sub>4</sub> ), mg/l	320.	332.	270.
Alkalinity (as CaCO <sub>3</sub> ), mg/l	376.	424.	362.
Hardness (as CaCO <sub>3</sub> ), mg/l	623.	715.	599.
Total dissolved minerals,mg/l	1082.	1042.	893.
Turbidity (lab)	90	87	87
Color	<1	<1	<1
Odor	None	None	Hydrocarbon
pH (in lab)	7.0	7.0	7.0
Temperature, °F	60.5	61.	60.5

Appendix B. Chemical Quality of Groundwater at IDOT Dewatering Sites  
at I-64 and 25th Street

Site	I-64	I-64	I-64	I-64	25th
Well No.	3	10	11	13	6
Section Location T.2N., R.9W., St. Clair Co.	7.6a	18.4g	7.7a	18.7h	17.6d
Date Collected	6/26/84	7/11/84	8/14/84	7/12/84	6/27/84
Laboratory No.	220089	220113	220248	220114	220090
Iron (Fe),mg/l	20.0	18.7	15.9	15.8	10.5
Calcium (Ca),mg/l	227.	277.	220.	204.	132.
Magnesium (Mg),mg/l	61.8	74.1	54.1	53.3	38.0
Sodium (Na),mg/l	87.1	222	45.6	29.8	14.2
Strontium (Sr),mg/l	-	1.2	-	0.9	
Silica(SiO <sub>2</sub> ), mg/l	33.0	32.8	35.2	34.7	34.0
Nitrate(NO <sub>3</sub> ), mg/l	<0.3	<0.3	0.3	2.3	<0.3
Chloride(Cl),mg/l	55.	390.	61.	50.	24.
Sulfate(SO <sub>4</sub> ), mg/l	625.	636.	358.	361.	176.
Alkalinity (as CaCO <sub>3</sub> ), mg/l	428.	424.	448.	412.	334.
Hardness (as CaCO <sub>3</sub> ), mg/l	821.	998.	771.	729.	486.
Total dissolved minerals,mg/l	1448.	1997.	1111.	1080.	663.
Turbidity (lab)	140	160	125	120	80
Color	<1	<1	<1	<1	<1
Odor	None	None	None	None	None
pH (in lab)	7.0	7.0	7.0	7.0	7.1
Temperature, °F	60.	61.	61.	60.7	58.5

Appendix C.

Chemical Analyses,  
Monitoring Wells at I-70 Well No. 3



Appendix C. Chemical Quality Data for the Monitoring Wells  
at I-70 Well No. .3

Legend		Units
pH	pH	units
COND	Conductivity	$\mu$ s
Eh	Redox potential	mV
Temp	Temperature	$^{\circ}$ C
D.O.	Dissolved Oxygen	mg O <sub>2</sub> /L
Alk	Alkalinity (as CaCO <sub>3</sub> )	mg CaCO <sub>3</sub> /L
D.I.C.	Dissolved Inorganic Carbon	mg C/L
T.I.C.	Total Inorganic Carbon	mg C/L
NVOC UF	Nonvolatile Organic Carbon, Unfiltered	mg C/L
NVOC	Nonvolatile Organic Carbon	mg C/L
NH <sub>4</sub> <sup>+</sup>	Ammonium	
NO <sub>3</sub> -N	Nitrate-Nitrogen	mg N/L
NO <sub>2</sub> -N	Nitrite-Nitrogen	mg N/L
SiO <sub>2</sub>	Silica	mg SiO <sub>2</sub> /L
SO <sub>4</sub>	Sulfate	mg/L
Cl	Chloride	mg/L
O-PO <sub>4</sub>	Ortho Phosphate	mg PO <sub>4</sub> /L
T-PO <sub>4</sub>	Total Phosphate	mg PO <sub>4</sub> /L
Fe+2 UF	Ferrous Iron, Unfiltered	mg/L
Fe+2	Ferrous Iron	mg/L
Fe+3	Ferric Iron	mg/L
Fe tot	Total Iron	mg/L
Na	Sodium	mg/L
K	Potassium	mg/L
Sr	Strontium	mg/L
Ca	Calcium	mg/L
Mg	Magnesium	mg/L
IBE%	Percent Ion Balance Error	

Appendix C. Chemical Quality Data for the Monitoring Wells  
at I-70 Well No. 3

Date	6 NOV 84	6 NOV 84	6 NOV 84	6 NOV 84
Elapsed Days	0	0	0	0
Well Number	0	1	3	5
pH	N.D.	7.38	7.05	7.39
COND	N.D.	1155	1165	1475
Eh	N.D.	0.046	0.046	0.022
Temp	N.D.	15.6	15.3	15.5
D.O.	2.4	0.38	0.23	0.28
Alk	461	439	459	436
D.I.C	N.D.	122.3	130.2	123.6
T.I.C	133.3	125.2	130.2	124.1
NVOC UF	N.D.	N.D.	3.45	N.D.
NVOC	N.D.	N.D.	N.D.	3.35
NH4+	0.41	0.82	0.7	0.7
NO3 -N	<0.1	<0.1	<0.1	<0.1
NO2 -N	<0.1	<0.1	<0.1	<0.1
SiO2	12.12	12.65	12.62	12.61
SO4	268	270	259	244
Cl	163.44	81.23	86.2	207.8
O-PO4	1	1.07	1.09	1.14
T-PO4	N.D.	N.D.	N.D.	N.D.
Fe+2 UF	10.8	11.85	12.1	11.7
Fe+2	N.D.	11.83	11.9	11.6
Fe+3	N.D.	N.D.	0.4	0.1
Fe tot	10.6	11.8	12.3	11.7
Na	136	76	84.4	154
K	12.4	10	10	11.2
Sr	0.78	0.745	0.66	0.86
Ca	193	177	178	171
Mg	43	38.9	44.1	46.9
IBE %	3.93	2.11	0.28	0.39

# Appendix C. Continued

Date	6 NOV 84	6 NOV 84	6 NOV 84
Elapsed Days	0	0	0
Well Number	7	9	11
pH	7.39	7.33	6.77
COND	1230	1910	1805
Eh	0.069	0.018	0.039
Temp	14.3	15.3	14.7
D.O.	0.24	0.33	0.26
Alk	425	435	428
D.I.C	122.4	127.5	123.5
T.I.C	120.3	127.8	124.3
NVOC UF	N.D.	N.D.	N.D.
NVOC	N.D.	N.D.	N.D.
NH4+	0.72	0.51	0.66
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	12.66	12.78	12.79
S04	229	304	292
Cl	158.9	388.6	368.04
O-PO4	1.39	1.18	1.08
T-PO4	N.D.	N.D.	N.D.
Fe+2 UF	14.1	14.8	14.8
Fe+2	14.2	14.8	14.8
Fe+3	<0.1	<0.1	<0.1
Fe tot	11	14.4	14.7
Na	134	257	228
K	11.2	12	11.2
Sr	0.65	0.83	0.78
Ca	160	N.D.	203
Mg	36.2	N.D.	45.1
IBE %	0.38	N.D.	0.89

Appendix C. Continued

Date	26 NOV 84	26 NOV 84	26 NOV 84
Elapsed Days	20	20	20
Well Number	0	1	3
pH	N.D.	7.08	7.05
COND	N.D.	1160	1225
Eh	N.D.	0.08	0.103
Temp	N.D.	15.6	15
D.O.	1.91	0.36	0.31
Alk	469	454	435
D.I.C	N.D.	130.2	125.2
T.I.C	N.D.	130.2	125.9
NVOC UF	2.5	3.8	2.7
NVOC	0.05	3.1	3.1
NH4+	0.69	1.62	1.53
N03-N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	30.9	32	32.1
S04	288	280	299
Cl	150.9	88.3	111.1
O-P04	0.5	1.1	0.77
T-P04	1.66	1.82	1.77
Fe+2 UF	11.33	11.93	11.55
Fe+2	N.D.	11.8	11.62
Fe+3	0.88	0.86	0.95
Fe tot	12.2	12.7	12.5
Na	131	89	106
K	12	9.84	9.66
Sr	0.59	0.66	0.64
Ca	192	179	178
Mg	43	41.9	41.1
IBE %	0.15	1.21	1.32

Appendix C. Continued

Date	27 NOV 84	27 NOV 84	27 NOV 84
Elapsed Days	21	21	21
Well Number	0	5	7
pH	N.D.	7.07	7.08
COND	N.D.	1220	1280
Eh	N.D.	0.105	0.113
Temp	N.D.	15	14.6
D.O.	N.D.	0.43	0.42
Alk	463	443	430
D.I.C	N.D.	127.1	122.9
T.I.C	139.5	126.6	123.3
NVOC UF	N.D.	0	4
NVOC	N.D.	0	2
NH4+	0.89	0.98	1.17
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	30.6	32.5	32.3
S04	298	252.9	232
Cl	151	144.4	170.5
O-P04	0.68	0.04	0.43
T-P04	1.54	1.81	1.96
Fe+2 UF	N.D.	11.7	11.29
Fe+2	N.D.	11.83	11.22
Fe+3	1.14	0.97	1.08
Fe tot	12.2	12.8	12.3
Na	130	118	133
K	11.9	10.8	11.2
Sr	0.57	0.53	0.49
Ca	191	184	171
Mg	43	42.6	39.8
IBE %	0.66	1.15	0.34

Appendix C. Continued

Date	28 NOV 84	28 NOV 84	28 NOV 84
Elapsed Days	22	22	22
Well Number	0	9	11
pH	N.D.	7.37	7.23
COND	N.D.	1690	1620
Eh	N.D.	0.111	0.117
Temp	N.D.	13.9	13
D.O.	1.35	0.43	0.61
Alk	468	460	468
D.I.C	N.D.	138.4	139.6
T.I.C	138.4	139.2	140.1
NVOC UF	N.D.	4	N.D.
NVOC	N.D.	N.D.	2.5
NH4+	0.51	0.51	0.53
N03-N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	30.9	31.8	32.1
S04	305	317	300.9
Cl	151	341.2	316.9
O-P04	N.D.	0.5	0.19
T-P04	1.71	1.96	2.04
Fe+2 UF	11.36	17.06	17.33
Fe+2	N.D.	17.04	17.24
Fe+3	0.84	1.56	1.36
Fe tot	12.2	18.6	18.6
Na	131	234	206
K	11.8	10.3	10.7
Sr	0.59	0.98	0.81
Ca	191	202	212
Mg	43.2	47.7	50.4
IBE %	1.26	0.74	0.13

Appendix C. Continued

Date	11 DEC 84	11 DEC 84	11 DEC 84
Elapsed Days	35	35	35
Well Number	0	1	3
pH	N.D.	N.D.	N.D.
COND	N.D.	1120	1200
Eh	N.D.	0.112	0.11
Temp	N.D.	10.9	11.1
D.O.	N.D.	N.D.	N.D.
Alk	N.D.	448	471
D.I.C	N.D.	126.8	139.9
T.I.C	137.6	131.1	140.7
NVOC UF	3.5	2.6	3.8
NVOC	0	2.9	2.
NH4+	N.D.	N.D.	N.D.
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	33.3	34.7	35.5
S04	293	279	353
Cl	142.6	79.4	128.9
O-P04	1.54	1.27	1.76
T-P04	1.64	1.36	1.91
Fe+2 UF	11.27	13	13.05
Fe+2	N.D.	12.96	13.1
Fe+3	0.41	0.24	0.3
Fe tot	11.8	13.2	13.4
Na	149	97	144
K	12.1	9.6	10.9
Sr	0.51	0.67	0.63
Ca	184	186	191
Mg	40.2	41.8	43.2
IBE %	N.D.	N.D.	N.D.

Appendix C. Continued

Date	11 DEC 84	11 DEC 84	11 DEC 84
Elapsed Days	35	35	35
Well Number	9	10	11
pH	N.D.	N.D.	N.D.
COND	1290	1160	1110
Eh	0.1,1	0.278	0.109
Temp	9.3	3.6	9.9
D.O.	N.D.	N.D.	N.D.
Alk	497	771	413
D.I.C	145.4	257.7	123.7
T.I.C	145	261.7	124
NVOC UF	2.6	N.D.	N.D.
NVOC	N.D.	0.5	N.D.
NH4+	N.D.	N.D.	N.D.
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	35.3	27.4	34.7
S04	391	456	258
Cl	145.7	60.8	138.6
O-P04	1.72	<0.05	1.7
T-P04	1.88	0.07	1.79
Fe+2 UF	14.47	0.21	10.99
Fe+2	14.31	0.04	10.77
Fe+3	0.29	0.34	0.23
Fe tot	14.6	0.38	11
Na	136	68.2	128
K	11.6	11.9	11.1
Sr	0.74	1.4	0.49
Ca	211	296	159
Mg	49.2	93.4	36.8
IBE %	N.D.	N.D.	N.D.



Appendix C. Continued

Date	12 DEC 84	12 DEC 84	12 DEC 84	12 DEC 84
Elapsed Days	36	36	36	36
Well Number	0	5	6	7
pH	N.D.	7.07	6.72	7.07
COND	N.D.	1280	1625	1290
Eh	N.D.	0.112	0.379	0.119
Temp	N.D.	14.6	17.4	14.5
D.O.	3.45	0.28	0.57	0.38
Alk	473	472	495	504
D.I.C	N.D.	137.1	223	145.7
T.I.C	130.4	137.1	227.5	146.6
NVOC UF	N.D.	N.D.	2.7	0.3
NVOC	N.D.	2.4	3	4.5
NH4+	1.04	1.34	<0.05	1.38
N03-N	<0.1	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1	<0.1
Si02	33.7	35.8	22.3	36.1
S04	307	334	358	389
Cl	143.7	149.8	282.3	146.8
0-PO4	1.5	1.68	<0.05	1.78
T-P04	1.64	1.8	0.06	1.89
Fe+2 UF	10.66	12.83	0.04	14.63
Fe+2	N.D.	12.91	0.02	14.41
Fe+3	N.D.	0.8	0.037	0.29
Fe tot	10.6	13.8	0.057	14.7
Na	149	137	66.8	130
K	12.1	11	14	11.4
Sr	0.53	0.63	1.26	0.64
Ca	184	197	336	221
Mg	40.2	46.6	87.2	51
IBE %	0.71	0.45	4.15	1.42

Appendix C. Continued

Date	18 DEC 84	18 DEC 84	18 DEC 84
Elapsed Days	42	42	42
Well Number	0	9	42
pH	N.D.	7.11	7.13
COND	N.D.	1340	1110
Eh	N.D.	0.115	0.113
Temp	N.D.	12.5	11.9
D.O.	3.94	0.64	0.48
Alk	468	498	438
D.I.C	N.D.	143	121.7
T.I.C	130.92	143.8	125.7
NVOC UF	3.75	2.5	3.2
NVOC	4.1	3.9	2.75
NH4+	1.27	1.36	1.04
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	32.5	34.1	34.5
S04	313	379.9	281.9
Cl	132.6	145.8	132.1
O-P04	1.61	1.74	1.72
T-P04	1.7	1 .86	1.8
Fe+2 UF	10.4	14.17	11 .85
Fe+2	N.D.	13.8	11.84
Fe+3	3.9	0.1	0.16
Fe tot	14.3	13.9	12
Na	148	136	98.6
K	11.9	12	11.4
Sr	0.49	0.63	0.57
Ca	181	204	175
Mg	40	48.1	41.6
IBE %	0.28	2.75	3.54

Appendix C. Continued

Date	7 JAN 85	7 JAN 85	7 JAN 85	7 JAN 85
Elapsed Days	62	62	62	62
Well Number	0	5	6	7
pH	N.D.	7.09	6.62	7.05
COND	N.D.	1260	1560	1290
Eh	N.D.	0.126	0.318	0.14
Temp	N.D.	9.4	6.8	7.6
D.O.	5.95	0.66	0.72	0.93
Alk	509	515	652	542
D.I.C	N.D.	139.3	221.2	148.5
T.I.C	131.4	141.2	224.2	144.7
NVOC UF	3.5	4.2	2.2	3.6
NVOC	3.4	0	2.9	3.3
NH4+	N.D.	N.D.	N.D.	N.D.
N03 -N	<0.1	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1	<0.1
SiO2	36.6	38.8	25	38.1
S04	240	304	316	243
Cl	138.2	145	305.1	152.1
O-P04	1.7	1.91	<0.05	1.85
T-P04	1.62	1.79	<0.05	1.77
Fe+2 UF	10.81	12.96	N.D.	15.12
Fe+2	N.D.	13.09	N.D.	14.35
Fe+3	0.69	0.31	N.D.	1.25
Fe tot	11.6	13.4	0.061	15.6
Na	149	143	79.7	136
K	12.2	11.5	15.3	11.9
Sr	0.42	0.51	1.2	0.54
Ca	185	198	335	218
Mg	41	46.8	87.8	51
IBE %	2.03	0.01	1.46	4.24

Appendix C. Continued

Date	8 JAN 85	8 JAN 85	8 JAN 85	8 JAN 85
Elapsed Days	63	63	63	63
Well Number	0	9	10	11
pH	N.D.	7.01	6.77	7.02
COND	N.D.	1230	980	1050
Eh	N.D.	0.124	0.246	0.13
Temp	N.D.	11.2	6.4	10.4
D.O.	4.45	0.73	0.96	0.66
Alk	503	524	786	464
D.I.C	N.D.	142	242.5	126.4
T.I.C	135	143.5	242.3	126.5
NVOC UF	N.D.	3.45	1.9	2.7
NVOC	N.D.	3.6	. 7.3	3.3
NH4+	N.D.	N.D.	N.D.	N.D.
N03 -N	<0.1	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1	<0.1
SiO2	38.8	32.9	32.7	40.9
SO4	237	364	409	252
Cl	139.6	150.4	91.1	134
O-PO4	1.71	2.05	0.1	1.81
T-PO4	1.59	1.76	0.09	1.31
Fe+2 UF	9.89	14.3	N.D.	13.6
Fe+2	N.D.	14.54	0.22	10.93
Fe+3	1.84	0.26	0.09	0.07
Fe tot	12	14.8	0.31	11
Na	148	128	68.8	99.7
K	12.2	11.7	12.3	11
Sr	0.57	0.67	1.43	0.57
Ca	187	222	300	185
Mg	41.4	51.8	93.4	43.8
IBE %	2.58	4.91	1.7	1.38

Appendix C. Continued

Date	9 JAN 85	9 JAN 85	9 JAN 85
Elapsed Days	64	64	64
Well Number	0	1	3
PH	N.D.	7.06	7.04
COND	N.D.	950	950
Eh	N.D.	0.133	0.13
Temp	N.D.	9.1	10.4
D.O.	6.16	0.66	0.69
Alk	478	470	473
D.I.C	N.D.	129.9	127.1
T.I.C	122.54	128.3	128
NVOC UF	N.D.	3.9	2.3
NVOC	N.D.	2.5	0
NH4+	0.38	0.66	0.56
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	37.8	39.3	38.3
S04	219	223	221
Cl	146.1	98.8	82.9
O-P04	1.45	1.78	1.74
T-P04	1.65	1.73	1.74
Fe+2 UF	10.2	12.98	12.26
Fe+2	N.D.	12.76	12.11
Fe+3	1.06	0.24	0.69
Fe tot	11.9	13	12.8
Na	137	93.5	83.3
K	11.5	10.3	9.81
Sr	0.54	0.57	0.42
Ca	182	185	181
Mg	40.6	42.6	41.6
IBE %	2.39	2.33	1.32

Appendix C. Continued

Date	14 JAN 85	14 JAN 85	14 Jan 85
Elapsed Days	69	69	69
Well Number	0	9	11
pH	N.D.	7.02	7.03
COND	N.D.	1010	980
Eh	N.D.	0.112	0.114
Temp	N.D.	12.2	12.8
D.O.	5.32	0.62	0.49
Alk	480	460	433
D.I.C	N.D.	133.8	123.6
T.I.C	131.3	134.1	124.2
NVOC UF	3.2	2.55	0
NVOC	3.15	3.6	3.9
NH4+	1.36	1.42	1.25
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	33.5	34.9	34.8
S04	296	339	238
Cl	142.6	143.7	157
O-P04	1.5	1.71	1.66
T-P04	1.55	1.82	1.76
Fe+2 UF	10.58	13.42	11.8
Fe+2	N.D.	13.42	11.69
Fe+3	N.D.	<0.1	0.51
Fe tot	N.D.	13.4	12.2
Na	138	117	114
K	12.7	11.2	11
Sr	0.49	0.65	0.57
Ca	194	203	180
Mg	43	48.4	42.2
IBE %	1.6	0.74	0.43

Appendix C. Continued

Date	15 JAN 85	15 JAN 85	15 JAN 85
Elapsed Days	70	70	70
Well Number	0	5	7
pH	N.D.	6.96	6.99
COND	N.D.	1135	1160
Eh	N.D.	0.123	0.124
Temp	N.D.	11.9	11.7
D.O.	5.56	0.64	0.78
Alk	475	495	494
D.I.C	N.D.	143.8	142.9
T.I.C	131.8	143.3	142.5
NVOC UF	N.D.	0	4.4
NVOC	N.D.	3.5	3.8
NH4+	1.13	0.99	0.99
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	34	36.6	36.4
S04	304	378	381
Cl	142.9	150.6	153.8
O-PO4	1.54	1.88	1.82
T-PO4	1.58	1.88	1.84
Fe+2 UF	10.92	13.96	14.64
Fe+2	N.D.	14.06	14.6
Fe+3	1.24	0.64	0.6
Fe tot	11.9	14.7	15.2
Na	136	140	129
K	12.8	11.7	11.8
Sr	0.57	0.73	0.64
Ca	196	215	221
Mg	43	49.8	51.8
IBE %	0.46	0.55	0.93

Appendix C. Continued

Date	16 JAN 85	16 JAN 85	16 JAN 85
Elapsed Days	71	71	71
Well Number	0	1	3
pH	N.D.	6.99	6.99
COND	N.D.	945	740
Eh	N.D.	0.127	0.128
Temp	N.D.	12.3	10.9
D.O.	6.18	0.78	0.71
Alk	478	163	442
D.I.C	N.D.	134.7	129.5
T.I.C	134.6	136.4	130.4
NVOC UF	N.D.	2.6	3.4
NVOC	N.D.	2.65	2.55
NH4+	1.12	0.49	1.26
N03 -N	<0.1	<0.1	<0.1
N02 -N	<0.1	<0.1	<0.1
Si02	37.4	36.7	36.2
S04	265	322	286
Cl	143	97.9	114.9
O-P04	1.52	1.77	1.66
T-P04	1.54	1.82	1.76
Fe+2 UF	10.88	12.46	12.43
Fe+2	N.D.	12.39	12.29
Fe+3	1.03	0.21	0.51
Fe tot	11.9	12.6	12.8
Na	139	129	100
K	12.6	10.8	10.2
Sr	0.59	0.62	0.65
Ca	195	183	179
Mg	42.8	42	41.6
IBE %	N.D.	0.65	1.72